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ABSTRACT

The introduction to this addendum (the Action Plan is LI 004 521) discusses the present use by libraries of information-handling technology and identifies some of the trends taking place in performing essential library services. While some limited inroads have been made in automating certain public library functions, the bulk of services is still being performed in much the same manner as has been the case for years. This is not because public libraries have not sought to be progressive, or have been reluctant to change traditional procedures. Rather, other pressures for public funds have often resulted in lower-than-desired funding for library projects. Moreover, many of the promising applications of new technology have not been developed to the point where they are appropriate for implementation in public libraries on any large scale. New methods of storing, retrieving, and disseminating information are needed, and it is in the realm of new technology and its application to public library functions that perhaps the greatest benefits will lie. With this in mind, an examination of potential new technology and the possible implications on the Florida library system is appropriate. Included in this discussion are broadband coaxial cable, cartridge television, and the implications of communications for Florida's library system. (Author/SJ)

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Report 240

ACTION PLAN FOR FLORIDA'S PUBLIC LIBRARIES

ADDENDUM

Prepared for

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IMPACT OF COMMUNICATIONS TECHNOLOGY ON LIBRARY SERVICES

INTRODUCTION

The desire to make library information and materials more available to more people has been of prime concern to librarians for many years. Recognition of the fact that storage of information serves no benefit unless people can use that information has led to attempts by libraries to become more active in their service role. For example, many of the early circulating libraries provided home delivery services and charged small fees for the use of books. Experiments in mail delivery of books were tried more than seventy-five years ago. But it was the acceptance of the concept of free public library service that provides the best example of making library materials widely available. Today, there are about 7,600 public library systems in this country, or a public library located in about one of every four counties.

Even though these facilities have resulted in widespread accessibility to library materials, librarians have continued to seek ways of being more responsive to the information demands of the public. Mail delivery is still being used in some places, drive-in windows have been opened, and many libraries now will accept book requests by telephone. Bookmobiles are a more recent example of extending services to where people are located, just as is the establishment of branch libraries. But many people still consider it too inconvenient or expensive to use the public library, although tremendous progress has been made in making the services more available. A compounding problem is the enormous growth in numbers of books, periodicals, and other materials which libraries are generally required to have available.

Many factors can be cited as restricting libraries in fulfilling their objective of better and more extensive service. Certainly, many more accomplishments could be made if more money were available, but the lack of appropriate technology for relieving some of the growing information-handling demands is also a contributing factor.

PRESENT TECHNOLOGY

The degree of use of communications equipment by public libraries today varies from telephones in small, rural locations to slide and movie projectors, record players, tape recorders, and other modern instructional or entertainment equipment in large, metropolitan facilities. Emphasis by most library systems has been placed on modernizing existing buildings or constructing new ones and on adding to present collections. Some have supplemented their own collections by cooperating with other libraries in offering interlibrary loan arrangements, thus providing a wider selection of materials from which users may choose.

Microfilm and microfiche are now used extensively by many libraries to relieve storage problems and convert printed material to a form which isn't as susceptible to deterioration as are books, magazines, and newspapers. Not only are storage requirements dramatically reduced (microfilm uses only five percent of conventional storage space) but the time and effort traditionally spent by librarians in weeding out infrequently used or outdated materials is greatly reduced. Libraries have found, though, that the conversion to microfilm or microfiche is expensive and that the display units are costly, bulky, and inconvenient to operate.

The trend on the part of many libraries to break away from being stereotyped book museums and to attempt to become more active in their promotion of library services has been briefly mentioned before. In many cases, communications technology has been used in the efforts. Radio broadcasts have been used to alert patrons of new additions to the library or to special events that may be taking place. Some libraries maintain current awareness services where users may specify areas or topics of interest and be notified when pertinent materials are available. Similar to this service is the provision of research by library staff members in developing bibliographies or in answering questions from the public. A few libraries distribute catalogs of their holdings so that people can conveniently look at what's available without having to go to the library and browse.

Libraries have long recognized the storage and retrieval benefits offered by computers and a distinct trend toward increased use of this technology is noticeable. The most extensive applications have been in special or academic libraries, however, rather than in public

libraries. The research orientation of these institutions, coupled with their tendency to budget more adequately for this type of activity, has prompted a dependence on computers as a solution to making their materials more accessible and their services more efficient. But by far the most experience has been gained in data processing applications of computers, rather than in the storage and retrieval of knowledge. Considerable resources have been allocated at the federal level; for example, intensive effort has been devoted by the Library of Congress, the National Agricultural Library, and the National Library of Medicine in developing computer programs to facilitate the exchange of machine-readable bibliographical information among libraries.

POTENTIAL NEW TECHNOLOGY

The previous section discussed the present use by libraries of information-handling technology and identified some of the trends taking place in performing essential library services. While some limited inroads have been made in automating certain public library functions, the bulk of services is still being performed in much the same manner as has been the case for years. This is not because public libraries have not sought to be progressive, or have been reluctant to change traditional procedures. Rather, other pressures for public funds have often resulted in lower-than-desired funding for library projects. Moreover, many of the promising applications of new technology have not been developed to the point where they are appropriate for implementation in public libraries on any large scale. Instead, the present time is more a period of experimentation in applying technology to performing library functions. New ideas have been generated, and demonstration projects have been sponsored by government bodies and foundations. Much of this experimentation is taking place in academic and special libraries and eventually will yield benefits for public libraries.

But this probable fall-out will not provide all the answers to the access problems which are presently being encountered. New methods of storing, retrieving, and disseminating information are needed, and it is in the realm of new technology and its application to public library functions that perhaps the greatest benefits will lie. With this in mind, an examination of potential new technology and the possible implications on the Florida library system is appropriate.

Broadband Coaxial Cable

In the general field of communications, no development offers more potential far-reaching effects than broadband coaxial cable. It is most commonly used now by community antenna television (CATV) systems to distribute television signals, but is also used extensively by common carriers for voice and data transmissions. It is through the growth of CATV, though, that the tremendous information-carrying capacity of cable will be made widely available.

Cable systems were started over twenty years ago as a means of improving television reception in rural areas which were either distant from stations or in mountainous terrain where broadcast signals were obstructed. Antennas were usually installed on the highest point close to a community and the signals were amplified and distributed to subscribing homes over a cable carrying three to six television channels. But the additional stations and improved reception available over cable became increasingly attractive features, particularly with the advent of color broadcasting, and the number of systems throughout the country has grown tremendously. Today there are over 2,600 systems operating, having about 5.5 million subscribers. Cable technology has improved to the point where the newer systems are installing cables with a capacity of 20 to 40 television channels. Since one television channel provides a bandwidth sufficient for about 1,125 normal telephone voice lines, the tremendous capacity for carrying information is evident.

CATV has grown considerably in Florida. There are presently 73 systems operating within the state with a total of about 190,000 subscribers. These are almost double the figures of just three years ago. Further dramatic growth is indicated by the 95 systems which have been granted franchises but are not yet operational, and the 100 other communities where applications have been made but franchises have not been awarded.

Until recently, regulatory restrictions by the Federal Communications Commission have limited cable expansion primarily to smaller towns and cities. But a shift in the FCC's posture relative to cable in metropolitan areas has occurred and, with the introduction of cable into large cities, a much higher percentage of homes will have the service available than the present 10 percent. In return for operating privileges in large cities, cable systems will be required to provide channels for public access and for local governments and educational institutions.

New cable systems are being urged by the FCC to provide for growth in nonbroadcast services in their initial installations. Among possible services of this type are at-home shopping, meter reading, mail delivery, and two-way communications. The technology exists, for instance, for newspaper or magazine publishers to distribute their products by cable to the home for either video display on the television screen or automatic printout of any particular pages desired. While technically feasible, these and other services are not yet at the stage of being economically attractive, but the proliferation of cable systems in the future may alter this situation.

Cartridge Television

Cartridge television represents a dramatic new development in the technology for delivering television programs. The program material is stored in small film or tape cartridges which can be inserted into a playback unit for showing through a television receiver at a time chosen by the user. The viewer has complete control of the program and may even stop the picture if desired. At least one of the systems already developed has the capability not only of stopping the picture, but also of advancing the picture frame by frame for detailed examination.

There are four principal playback systems which are presently being developed: magnetic tape, photographic film, holographic tape, and plastic disc. Variations within each of these technological systems are still developing and, as a result, cartridge systems are not compatible. The potential market for this new equipment is so large, however, that some of the largest companies in the electronics industry are investing tremendous amounts of money to perfect an acceptable system. Several of the systems are now being marketed in the institutional and educational fields, but the costs are not yet low enough for the consumer market.

It is expected that within three years market competition likely will force many companies and the less promising systems out of the market, and some small number of firms and systems will emerge. This will result in some measure of standardization and compatibility, along with realistic costs, and will promote widespread availability of programming materials.

Applications of cartridge television in libraries on more than a modest scale are still at least five or more years away because of the standardization, development, and engineering problems still remaining. Once these problems are solved and costs become reasonable, it can be expected that libraries can effectively use the player units. Being able to select at the user's convenience that program which pleases him and also to be able to stop the picture for detailed examination are analogous features to books. Some limited experimentation in libraries is taking place; for example, starter collections for 100 public libraries in New York were announced last year. The library's continuing education function can be attractively supplemented with cartridge television, in addition to the recreational and entertainment applications.

Computers

The desirability of applying computer technology to performing library functions was recognized well over 10 years ago and is presently in a state of relatively advanced experimentation and application. By far, the greatest use has been to aid library management in technical processing and circulation functions. Also, using computers to store bibliographic information for either hard-copy printout or display on a television screen is widespread. Numerous books and articles have been written on computer applications in libraries and organizations such as the American Library Association and the Council on Library Resources are monitoring progress in the field.

Two developments in computers must be accomplished before truly extensive use by libraries can take place. A good, effective man-machine interaction language must be developed and the storage capacity and processing speeds must be greatly increased before efficient searches of large bodies of information can be made. Moreover, it seems clear that library systems should choose to time-share with very large computer installations rather than going toward individual library use of small computers. But this necessitates interconnection of many locations and, at the present time, is quite expensive. There is no means presently available for storing entire libraries economically, and no economical method exists for translating books into machine-readable form.

Holography

Perhaps the most promising potential solution to computer storage problems will be the use of holographic memory systems. A technique of lensless photography which uses laser beams to record images on film, holography is still in the very early stages of development, and it will be at least another decade before useful computer applications will become possible. But intensive research and development work in holographic memories is taking place by a large number of corporations, including IBM. The most frequently used illustration of its storage capacity is that the whole Encyclopedia Brittanica could be stored in a one-inch square of thick film. The storage capacity is so great, in fact, that present computers couldn't use it even if it were available. While library use of holography is in the distant future, the potential it offers is tremendous.

Intercity Transmission

Recent developments have taken place in the common carrier field which promise to lower significantly the transmission costs of intercity communications. The Federal Communications Commission has decided to allow open competition between existing carriers like the American Telephone and Telegraph Company and new special service common carriers like Microwave Communications, Inc. (MCI), which plans a nationwide, interconnected network to be completed by the end of 1973. The initial portion, between Chicago and St. Louis, has just started operating, and FCC permission has been granted to start constructing the New York to Washington section. One segment of the MCI network will connect most of the major cities in Florida. Thus, locations throughout the state could be interconnected using this network, or using facilities of established common carriers whose tariffs are likely to be reduced because of this new competition. The expected growth of cable systems will provide the mechanism for local distribution to homes and offices.

IMPLICATIONS OF COMMUNICATIONS FOR FLORIDA'S LIBRARY SYSTEM

The previous discussion provides a framework for considering how developments in communications can be used in furthering the activities of Florida's public library system. Traditional library procedures will not be dramatically altered in the near future by new technology, although it is clear that increased reliance on mechanizing certain library

functions will result from the ongoing experimentation and application of existing technology taking place in special, academic, and a few large public libraries. The benefits of these adaptations will accrue primarily to the larger libraries, however, since they are the ones most likely to have sufficient budgets for supporting automation development. Once the adaptations, particularly in computers and display devices, become economically implementable, individual libraries will be able to shift personnel from performing administrative tasks to meeting the public's needs directly. Many of these administrative functions, such as developing catalogs or bibliographies and ordering new materials, can be performed more efficiently at some central location. But before these advantages can be gained on any extensive scale, emphasis must be placed on solving problems on a statewide basis.

Achievement of the goals of the Florida Library Study Commission's PROJECT 80 will require an increased degree of coordination, cooperation, and communication among the libraries, particularly the proposed resource centers. The concentration of superior collections in these locations, coupled with their responsibility for library services throughout the Districts, will make effective communications an essential ingredient in future operations.

Florida's present interlibrary communications consist of two teletype systems. One connects, at state expense, the State Library in Tallahassee with the four resource centers in Jacksonville, Miami, Orlando, and Tampa, and is used primarily for interlibrary loan requests. The State Library receives requests and forwards the material as required, including those mail requests from libraries without teletype access. The second teletype system connects the State Library and eight state university libraries (University of West Florida, University of South Florida, University of Florida, Florida State University, Florida A. & M., Florida Atlantic, Florida Technological, and University of Miami). The State Library pays for these terminals using federal funds, and the university libraries provide interlibrary loan materials. The University of Florida Health Center also participates but pays for its own terminal.

The experience gained by these libraries in their interinstitution communications will be an important factor to consider in planning. However, these systems have been used primarily for interlibrary loan requests, and it is the need for communications on a much broader

scale which requires emphasis. The conversion to the district system will present an opportunity for the Florida library system to integrate telecommunications into performing its public services. Planning for communications among library locations can take place concurrently with effecting organizational changes so that the end result will be a system which complements statewide service.

In the short range, telephone and mail will have to be relied on in addition to teletype services at all resource centers. Beyond this, more extensive information about present and expected future interlibrary communications must be gathered. This would include not only traffic pattern analysis of the teletype systems but also determination of the telephone usage patterns among library locations. Moreover, the amounts, types, and frequencies of mail communications should be studied to determine the potential for shifting these communications to other methods. Profiles of intercity traffic can then be generated which will illustrate the demand for a statewide network. Consideration should also be given to the extent to which other state agencies might share such a network. It is only after these measurements of demand are analyzed that intelligent choices can be made among the alternatives which will be available in the next decade.

The initial alternative will be to choose between narrowband or broadband communications facilities. Narrowband refers to teletype and telephone circuits while broadband includes various larger circuits for data, facsimile, or television use. The urgency or speed with which communications must take place is essential to such a choice. For example, if facsimile reproduction between resource centers were determined necessary, a normal page of print could be sent from one location to another over a regular telephone circuit in six minutes. But this same page of print could be sent in only six seconds if a circuit 60 times as large is used. Since the cost of the circuit is closely proportional to the size, it is clear that speed of transmission may have to be balanced against dollars.

Narrowband interconnection of the resource centers and other appropriate locations is partially complete now. The teletype systems have been discussed and each of the libraries can use the dial-up network of the telephone companies for communicating with other libraries. Full-time use of telephone lines can also be achieved, if desired, by leasing dedicated circuits from the common carriers. Broadband interconnection, though, is not generally available. The facilities can be provided by common carriers in only selected locations, construction frequently is necessary, and the costs are prohibitive.

The future promises some relief for this situation, however. The new special service common carriers will provide what is expected to be a cheaper means of connecting intercity locations. Although the tariffs for these services are uncertain, the significance for Florida will be that an alternative to what is presently available for intercity communications will exist in the near future. During Phase I of PROJECT 80, the demand measurements previously mentioned should be made to determine the need for a communications network.

As further progress is made in computer storage of bibliographic and other information and as the costs for such functions become more affordable, the desirability of centralizing certain administrative functions would be a worthwhile consideration. For instance, the location of data processing equipment and trained personnel at the universities suggests the possibility of using these existing capabilities, augmented as necessary, as the bibliographic storage information centers. Moreover, the locations of those library items not generally available throughout the system could be stored and furnished when loan inquiries are made.

A hierarchy of communications capability may be the most desirable course for the Florida library system to consider. The smaller, out-lying libraries within a district could rely on mail and telephone for communications with the resource center, with that entity either furnishing the requested information or assuming responsibility for fulfilling the request. The next level in the hierarchy could be to have the resource centers and the State Library interconnected on a full-time basis. Initially this would be by teletype, but other means could also be explored, such as leased telephone or data lines. The telephone lines could permit facsimile transmission between resource centers, and the data circuits could be used for gaining access to centrally-stored bibliographic information. The top level of a possible hierarchy of communications for the library system could be to interconnect the university libraries and other special libraries with the resource centers, thus yielding a truly integrated system for meeting the knowledge needs of the public. Additionally, it may be desirable for such a network to have access to other state or national information storage centers. But much more study of the demand and uses for part or all of such a network will be necessary before a decision can be made.

The discussion to this point has focused on statewide communications, but developments in cable and cartridge television have implications for individual library acitivities. The expected growth in cable television systems will result in an enormous amount of communications capacity to homes and offices in many of the cities in the state. While most of the channels on these systems will offer traditional commercial and educational television fare, other channels will be offered for lease. Libraries will have to compete economically with other users for these channels, and this necessarily will restrict their use. It may result that regulatory concessions will be made to libraries as favored users, although the likelihood of this happening is difficult to forecast. Library boards may choose not to become video programmers, but the potential these channels offer for extending library services to the people is worthwhile to consider. The expected growth in education outside the formal system promises to increase the importance of libraries, and helping to deliver this type of instruction via cable is within the realm of becoming a library function. Also, the requirement for two-way capability in future cable systems will permit interaction between the user and originator, with distinct educational advantages. Entertainment could also be offered; for example, the puppet shows presented in the Tampa library could be adapted for cable presentation most attractively and thus be more widely available to children in Tampa and other cities. Client awareness activities by libraries are another function which could be supplemented by using cable.

It is cartridge television, though, which may prove to be the most exciting development. Libraries can be expected to store television cartridges for use by the public, just as they have stored phonograph records and tape cassettes or reels in the past; and cartridge players will become important pieces of library equipment. Although programming for this new medium is in its infancy, available offerings number in the thousands and cover a spectrum of interests ranging from sports to preventive medical care. Entirely new types of programs and formats, presently only imagined, will be developed. It offers a dramatic new means for informing and entertaining, one which is totally under control of the user. Thus, a dramatic addition to library services will occur, and the essentiality of libraries will become even more pronounced.